

## **“Effectiveness of Video Assisted Teaching Module on knowledge regarding umbilical cord blood stem cells banking among staff nurses in selected hospitals of Odisha” - A Pilot Study Report.**

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### **Abstract:**

Vinesh, 2017 states that stem cells are the foundation of the human body and considered as the master cell of the body. Blood, bones, skin and muscles are formed from the master cells known as stem cells that act as building blocks of our body. Just like a seed of a plant which gives branches, leaves and fruits and these stem cells have the potential to develop into specialized cells of our body such as blood cells, muscle cells, brain cell, etc. Waller-Wise, 2011 reviews that umbilical cord blood was once considered as a waste product of the birthing process, but now it is valued for its stem cells. Nearly 30 years after the first successful umbilical cord blood stem cell transplant, now more families are seeking information about whether or not to invest in saving their newborn's umbilical cord blood. Saving the cord blood in public banks is a worthy undertaking for any family. The unavailability of bone marrow donors and the problems related to bone marrow transplantation including graft failure and graft-versus-host disease, have urged the search for alternative sources for bone marrow cells. Therefore, the investigator felt the need to create awareness and conduct the study to educate staff nurses on UCB stem cells banking. An experimental research approach with quasi-experimental one group pre and post-test design was adopted. Convenience sampling technique was used to select 190 staff nurses working in selected Hospitals of Odisha. A closed ended knowledge questionnaire and video assisted teaching module were administered. Mean post-test knowledge scores were significantly higher than the mean pre-test knowledge scores. There was an improvement in the level of knowledge as tested by paired 't' test & Chi-square test. Results were found to be statistically significant ( $P < 0.05$ ). This study demonstrated that VATM on UCB stem cells banking was effective in improving the knowledge of staff nurses.

**Key Words:** Effectiveness, Knowledge, Assess, VATM & UCB stem cells

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### **I. Introduction**

**“We are not made of drugs; we are made of cells”.**

**Cade Hildreth**

Becoming mother is a wonderful and exciting experience for a woman in her life. The maternal bond between a female and her biological child usually begin to develop during pregnancy. A vital link that supports and nourishes the baby in the uterus for nine months is umbilical cord. It's referred as the life line and it's through this cord that placenta and foetus are attached to each other. Umbilical cord is essential vitalizing, direct interlink between mother and her child, which is always depicted as blood relationship and emotional bonding of motherhood. (Josi et al., 2017)

The umbilical cord forms the connecting link between the fetus and the placenta through which the fetal blood flows to and from the placenta with the umbilical vein carrying oxygenated blood with nutrients from the placenta to the foetus and the umbilical arteries carrying deoxygenated blood with waste products from the foetus to the placenta. It extends from the fetal umbilicus to the fetal surface of the placenta. Near the end of the first trimester, the umbilical cord composed of two umbilical arteries and one umbilical vein surrounding by a gelatinlike extracellular matrix known as Wharton's jelly. Umbilical cord is about 50 cm in length with a usual variation of 30 – 100 cms. (Heil, J.R. & Bordoni, B., 2020).

Umbilical cord blood was once considered as a waste product of the birthing process, but now it is valued for its stem cells. Nearly 30 years after the first successful umbilical cord blood stem cell transplant, now more families are seeking information about whether or not to invest in saving their newborn's umbilical cord blood. Saving the cord blood in public banks is a worthy undertaking for any family. The unavailability of bone

marrow donors and the problems related to bone marrow transplantation including graft failure and graft-versus-host disease, have urged the search for alternative sources for bone marrow cells. (Waller-Wise, 2011)

The placenta representing an important source of fetal blood stem cells, which was discarded soon after birth. Umbilical cord being a potential source for hematopoietic stem cells (HPSC) and the evidence of advantages over bone marrow, attention has shifted to the development of umbilical cord blood banking. (Neha et al., 2018)

Stem cells are the foundation of the human body and considered as the master cell of the body. Blood, bones, skin and muscles are formed from the master cells known as stem cells that act as building blocks of our body. Just like a seed of a plant which gives branches, leaves and fruits and these stem cells have the potential to develop into specialized cells of our body such as blood cells, muscle cells, brain cell, etc. (Vinesh, 2017)

Gheorghe (2015) states that stem cells are important for living organisms for various reasons. A three to five days old embryo is called a blastocyst. The inner cells give rise to the complete body of the organism, including many specialized cell types and organs such as the heart, lung, skin, sperm, eggs and other tissues.

Cord blood is a unique product, rich in haemopoietic stem cells (which can differentiate only into blood cells), and should not be confused with embryonic stem cells or pluripotent stem cells, which can differentiate into any cell in the body. This is why cord blood cells are currently used to treat blood and immune system related genetic diseases, cancers, and blood disorders. (Pandey et al., 2016)

As the newborn is delivered, and the umbilical cord is cut, blood can be collected from the segment of cord still attached to the placenta. Stem cells retrieved from the blood in the remaining segment of the umbilical cord and placenta is known as ‘umbilical cord blood (UCB) stem cells. (Pandey et al., 2016)

According to Gheorghe (2015) three significant qualities of these stem cells are:

- a) capability to turn into any type of cell in the body
- b) replicate or copy them limitlessly
- c) responsible for repair and regeneration functions in the body.

It is because UCB is a highly enriched stem cell source, it is thought to be a helpful treatment for a number of genetic diseases, blood malignancies, and immune deficiencies. UCB may also be used for a sick sibling or relative. Banking UCB is thus a way to preserve potentially life-saving cells that are usually discarded after the interruption of the blood supply from the umbilical cord to the new-born infant. (Roura et al., 2015)

#### **Objectives:**

1. Assess existing knowledge of staff nurses regarding umbilical cord blood stem cell banking.
2. Assess post- test knowledge scores of staff nurses regarding umbilical cord blood stem cell banking after implementation of the tool.
3. Evaluate the effectiveness of video assisted teaching module regarding umbilical cord blood stem cell banking among staff nurses.
4. Evaluate the effectiveness of video assisted teaching module regarding umbilical cord blood stem cell banking among staff nurses.
5. Find out the association between post- test knowledge scores of staff nurses with their selected demographic variables.

#### **Hypotheses:**

- **H<sub>01</sub>:** There will be no significant difference between pre-test and post-test knowledge scores of staff nurses regarding umbilical cord blood stem cell banking.
- **H<sub>02</sub>:** There will be no significant association between post-test knowledge scores of staff nurses regarding umbilical cord blood stem cell banking with their selected demographic variables.

#### **Delimitations:**

##### **The study is limited to-**

- The registered nurses working as staff nurses irrespective of their professional qualifications.
- The staff nurses working in the selected hospital with minimum of three years’ experience of which one year in O & G departments.
- Those were willing to participate.
- Those were present during the period of data collection.

## **II. Methodology**

#### **Research design & Approach:**

The research design used in this study was quasi-experimental one group pre-test & post-test design to answer the hypotheses and to find out the effectiveness of VATM on umbilical cord blood stem cells banking among staff nurses working in selected hospitals of Odisha.

**Fig -1: Schematic Representation of the Research Design**

PRE-TEST	INTERVENTION	POST-TEST	EFFECTIVENESS
O1	X	O2	E = O2-O1

**O<sub>1</sub>** → Knowledge assessment of staff nurses regarding umbilical cord blood stem cells (UCBSC) banking before introduction of video assisted teaching module.

**X** → Implementation of video assisted teaching module on umbilical cord blood stem cells (UCBSC) banking.

**O<sub>2</sub>** → Knowledge assessment of staff nurses regarding umbilical cord blood stem cells (UCBSC) banking after intervention.

**E** → Effectiveness (**O<sub>2</sub> – O<sub>1</sub>**)

**Setting of the study:**

The study was conducted at City Hospital, Cuttack, Odisha. It is a 130 bedded multi-speciality district headquarter hospital situated in densely populated city (Cuttack) of Odisha.

**Population:**

In the present study, population comprises all the staff nurses working in City hospital, Cuttack, Odisha.

**Sample:**

Staff nurses working in City hospital, Cuttack, Odisha & have at least one year of experience in O & G department.

**Sample size:**

30 staff nurses

**Sampling technique:**

Convenience sampling technique was used to select the sample

**Sampling criteria:**

**i. Inclusion criteria:**

The nurses who were:

- working in City Hospital, Cuttack, Odisha.
- willing to participate in the study.
- registered irrespective of their professional qualification.
- having minimum of three years' experience in the hospitals.
- having minimum of one-year experience in O & G department.
- present during the period data collection.

**ii. Exclusive Criteria:**

- Those who were on special duty outside the hospital for corona care.
- Those were sick.

**Tools for data collection:**

• **Preparation of Tool:**

The steps used for preparation of the tool:

- Literatures such as research reports, books and other literatures were reviewed.
- Blue print was prepared.
- Tools were prepared
- Preparation of closed ended questionnaire.
- It has two sections: Demographic data & Knowledge questionnaire.

➤ **Review of literature:**

Questionnaire & Video assisted teaching module prepared after review of literature such as study related books, journals, newspapers, proceedings, unpublished research reports, online searches, etc were used to develop tool.

➤ **Preparation of the blue print:**

The blue print of items pertaining to knowledge of staff nurses was prepared as per the objectives. The blue print includes stem cells, merits & demerits of UCB stem cells, UCB stem cells banking which includes collection, transportation, testing and processing and preservation of UCB stem cells. The guide was consulted during the preparation of tool.

• **Description of the Tool:**

Two tools were used for data collection: Tool-1 & Tool-2

i. **Tool 1:** Closed ended multiple choice knowledge questionnaires which have two parts:

**Part A:** It includes selected demographic data related to the staff nurses under study such as habitat, age in years, religion, professional qualification, total working experience, experience in O& G department and sources of information regarding umbilical cord blood stem cells banking.

**Part B:** Includes closed ended multiple-choice questionnaire regarding umbilical cord blood stem cells banking, which has three sections:

- i. General knowledge on stem cells.
- ii. Merits & de-merits of UCB stem cells.
- iii. UCB stem cells banking which includes collection, transportation, testing, processing & preservation of UCB stem cells.

• **Scoring:**

There were 35 items pertaining to the knowledge on umbilical cord blood stem cells banking. Each item had four options with only one appropriate answer. The total score was 35. Each correct answer was awarded with ‘one score’ while, incorrect answer was awarded ‘zero score’.

Score	Levels of Knowledge
Below 20 %	Very Poor
Between 21– 40%	Poor
Between 41- 50%	Average
Between 51-70%	Good
Above 70%	Excellent

ii. **Tool 2: Video Assisted Teaching Module on umbilical cord blood stem cells banking.** Video Assisted Teaching Module content was prepared on the basis of the following steps:

a. **Literature referred to the umbilical cord blood stem cells banking:**

The literatures such as books, journals, reports, articles regarding umbilical cord blood stem cells banking were referred to prepare the contents of VATM.

b. **Organization of contents of VATM on UCB stem cells banking:**

- Stem cells
- Merits & de-merits of UCB stem cells
- UCB stem cells banking:
- Collection of UCB stem cells
- Transportation of UCB stem cells
- Testing & processing of UCB stem cells
- Preservation of UCB Stem cells
- Nurses’ role in UCB stem cells collection & banking.

**Validity:**

The tools after construction were sent to 10 experts, who include Professor in O & G dept. (1) & Haematology dept. (1), professors in O& G nursing (4), professor in paediatric nursing (1), medical-surgical nursing (2) & statistician (1) for establishing the content validity. According to the experts’ suggestions the tool was modified. Modifications were made as per suggestions of two or more validators.

**Reliability:**

Closed ended multiple choice questionnaire was tested for reliability. The questionnaire was implemented on 20 staff nurses at City Hospital, Cuttack, Odisha. The reliability of tool was established by testing the internal consistency. Reliability of the questionnaire was tested through split half method. The

questionnaire had 35 items. The tool was divided into odd and even items, to check its internal consistency. The co-relation co-efficient was calculated using the Spearman Brown Prophecy formula as follows:

**Spearman Brown Formula**

$$r^2 = 2r/1+r$$

Reliability obtained was 0.894 which indicated that questionnaire is highly reliable to conduct research study.

• **Preparation of final tool:**

After testing validity, suggestions & comments of the experts were incorporated to modify questionnaire & video assisted teaching module. The Guide was consulted while finalizing the tool.

**Ethical consideration:**

Prior to data collection, permissions from the Chief District medical Officer & Medical Superintendent of the City Hospital, Cuttack were taken. After permission, (Matron) nursing was requested in written to extend co-operation. Further, samples selected were contacted & explained the purpose of the study & written consent was taken for participation in the study.

**Pilot study:**

Pilot study was conducted on 30 samples during the period of 1<sup>st</sup> June 2020 to 30<sup>th</sup> June 2020 and analysed for feasibility of the main study. The pilot study was conducted in 130 bedded City Hospital, Cuttack which is other than the sample hospital under the main study (SCB Medical College & Hospital, Cuttack).

First, the pre-test was conducted by the investigator among 30 staff nurses in one day in three shifts on 1<sup>st</sup> June 2020. Questionnaires were distributed by the researcher & half an hour time was given to complete the questionnaire. Later, all the questionnaires were collected by the researcher herself. Initially, it was planned to implement the VATM by the investigator in the hospital setting. Due to impact of corona and lock down, as per the feasibility expressed by the participants, the module was sent to each participant. After pre-test video assisted teaching module was sent to all participants through their e-mail id and 15 days’ time was given to go through the video and if any quarry to contact the investigator and clear the doubts. Participants’ doubts were cleared. After two weeks interval, post test was conducted on 16<sup>th</sup> June 2020 in the hospital in three shifts using the same questionnaire used for pre-test.

**III. Data Analysis And Interpretation:**

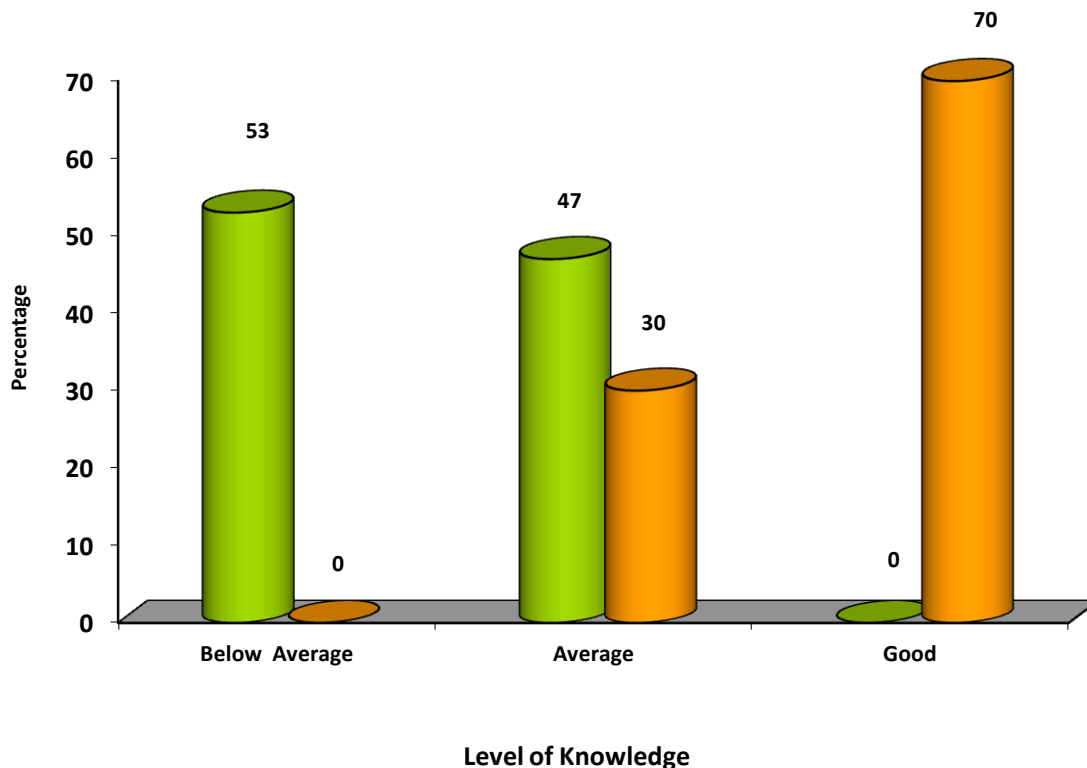
Data was coded and analysed through descriptive and inferential statistics. Mean, Median, mode, mean difference & standard deviation were used for descriptive statistics. Inferential statistics such as paired’ t’ test & chi square test were used for the significant of the study. Findings were presented in tables & graphs.

**TABLE-1: Frequency & Percentage distribution of demographic characteristics among staff nurses (N=30)**

Characteristics	No. of Participants	Percentage (%)
Age	20 - 30 Years	09
	31 - 40 Years	14
	41 - 50 Years	03
	>50 Years	04
Educational Status	Diploma Nursing	24
	Basic B.Sc Nursing	00
	P.B B.Sc Nursing	06
	M.Sc Nursing	00
Habitat	Urban	30
	Rural	00
Religion	Hindu	30
	Muslim	00
	Christian	00
	Others	00
Total Experience	1 - 5 Years	11
	6 – 10 Years	03
	11 – 15 Years	07
	>15 Years	09
Experience in O & G dept.	1 - 5 Years	14
	6 – 10 Years	02
	11 – 15 Years	08
	>15 Years	06

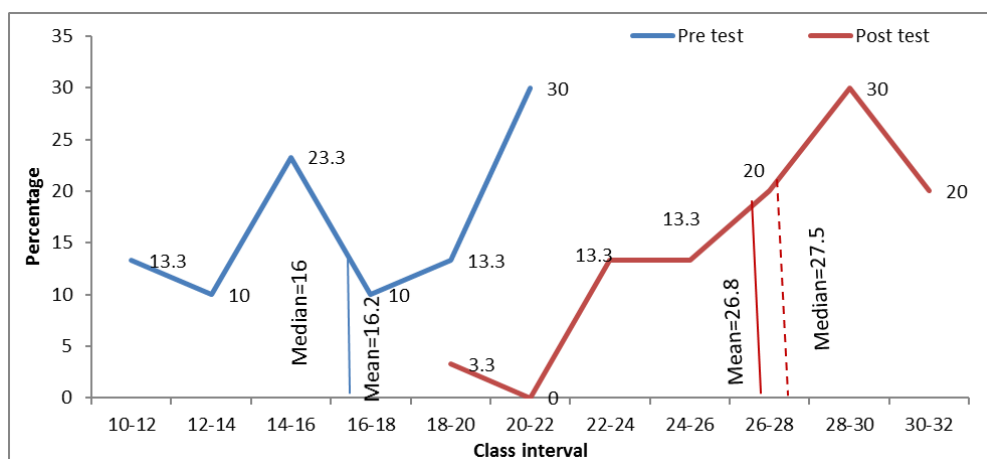
Sources of Knowledge	News Paper	05	17
	Books & Journals	02	06
	T.V & Internet	08	27
	Professionals	15	50

**Table – 1** shows that Maximum 14(47%) patients were from 31-40 years of age groups, majority 24(80%) were diploma in nursing, all 30(100%) were from urban, all 30(100%) were Hindu, majority 11(37%) had total years of experience between (1-5 Years), maximum 14(47%) had total years of experience in O & G department between (1-5 Years), and majority 15(50%) had sources of knowledge from professionals.



**Fig-1: Comparison of Level of Knowledge Score in Pre-test and Post-test (N=30)**

**Fig-1** shows that in pre-test, majority 16(53%) had poor (<50%) level of knowledge score & in post -test, majority 21(70%) had good (>75%) level of knowledge score. This result shows, Video assisted teaching module is effective.



**Fig-2: Line graph showing comparison of pre and post-test knowledge scores**

**TABLE-2: Significant difference between overall knowledge score in Pre- and Post- test (N=30)**

Knowledge Score	Total Score	Mean	Mean Difference	Median	Mode	SD	DF	t-value	P-value	Result
Pre-Test	512	17.06	12.30	17	22	4.25	29	20.18	0.05	Highly Significant
Post-Test	881	29.36		32	33	4.65				

Table Value-1.699

**Table-2** reveals that pre -test mean score was 17.06 and post- test mean score was 29.36. This mean difference (12.30) was a true difference not by chance. This depicted that there were significant relations between pre-test and post-test knowledge score. Total score in pre & post-test was 512 & 881. Mean, Median & mode in pre & post-test were 17.06, 17, 22 & 29.36,32, 33 respectively. Standard deviation in pre -test and post-test were 4.25 and 4.65 respectively and “t” value was 20.18. This shows that calculated “t” value (20.18) is more than table value (1.699) at df-29, so null hypothesis (**Ho1**) rejected & alternate hypothesis (**Ha1**) is accepted i.e.; there is significant difference between pre- test score & post -test knowledge score of staff nurses after intervention of video assisted teaching module on umbilical cord blood stem cell banking.

**Table 3: Association between level of knowledge in post-test and selected demographic data.**

Demographic variables	$\chi^2$	df	Table value	p-value	Significant
Age (in years)	5.24	3	7.815	0.303	Not significant
Educational qualification	0.34	3	7.815	0.124	Not significant
Habitat	0	1	3.841	0.325	Not significant
Religion	0	1	3.841	1	Not significant
Total year of experience as staff nurse	1.97	3	7.815	0.438	Not significant
Sources of knowledge on UCB Stem cell banking	4.88	3	7.815	0.931	Not significant

**Table-3** shows that calculated value of all selected demographic variables (Age, Habitat, Religion, Educational Qualification, total years of experience, experience in O & G dept. & sources of knowledge) was less than the tabulated value. So, null hypothesis (**Ho2**) is accepted i.e.; there is no significant association of post-test knowledge score with demographic variables.

**LIMITATIONS:**

The limitations recognized in the study were:

1. Because of covid-19 pandemic situation, it was difficult for the researcher to provide video teaching to all the participants physically in one place. So, following the covid-19 guidelines, the researcher sends the video on umbilical cord blood stem cell banking to each participant through online & clear their doubt, if any & did post -test after 15days. Therefore, the present study was a challenging task for the researcher, so this was the main difficulty faced by the researcher, anyhow, with the help of matron & other senior staff, researcher try her best to collect factual data from the participants & complete data collection in stipulated time.
2. Sample selected for the study was limited to staff nurses working at City Hospital, Cuttack only, which was other setting than the main study.
3. The tool used for data collection was not a standardized tool and it was a structured tool with close ended questions leads to restricted free response of the participants.
4. The tools used for data collection measures only knowledge level of staff nurses regarding umbilical cord stemcells banking.

**IV. Conclusion:**

The study findings revealed that there was significant difference between the pre-test and post-test knowledge scores of staff nurses after intervention of video assisted teaching module on umbilical cord blood stem cell banking. So, it depicted that video assisted teaching module is effective in enhancing the knowledge level of staff nurses on umbilical cord blood stem cell banking. Also, there is no significant association of post-test knowledge score with demographic variables.

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